

GTR-200

Generator Controller

Manual



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1 INTRODUCTION

The **GTR-200** is a full digital Gen-set controller equipped with all basic functions and LCD panel that includes error message display; faulty input detection, analog signal measurement and generator status. When the error occurred, GTR-200 shuts down the engine and real-time diagnosis can be done easily by reading LCD panel information. Furthermore, parameters can be adjusted from front panel in accordance with user's requirement by six setup keypad. Operating DC power range is from 8 to 38 volts and low power consumption in standby mode which is suitable for small battery charger.

2 FEATURE

- Analog Display includes: Coolant temperature, Oil pressure, Running hour, AC frequency, Engine speed, DC voltage, 3 phases AC voltage, 3 phases AC current, and 3 phases to neutral AC voltage.
- Protection information includes: Over speed (RPM), Low Frequency, High Frequency, High Coolant Temperature, Low Oil pressure, Over Crank, Low Fuel Level, Low Coolant Level, Low Battery, Sensor Open and Short, 24 error recorders, Fail to start recorder, and Total start attempts recorder.
- System Operation Buttons: Off, Auto, Manual, Pre-Heat, Stop, Rated / Idle.
- Parameters are Programmable by six setup keypads on the front panel.
- Super wide operating DC power range from 8 to 38 volts.
- Two colors back light makes it easier to distinct system status.
- 9 output Power Relays not only provide several functions but also endure heavy power capacity
- Equipped with high security terminal connector that provides easy plug-in and removal.

3 Specification

- DC power input range
8 ~ 38 VDC
- Power consumption
Max. 250 mA @ 12 V; 150 mA @ 24 V
- Measured Frequency
Range: 0 ~ 80 Hz
Minimum detecting volts: 10 V (AC)
Accuracy: 99.8%
- DC volt meter
Range: 10 ~ 31 V
Accuracy: 99.5%
- AC volt meter
Range: 15 ~ 512 V
Accuracy: 99.5%
- AC current meter
Range: Convert via CT ratio

- Accuracy: 99.5%
- Output capacity
8A / 30 V
- Operating temperature
-30 °C ~ 70 °C
- Storage temperature
-40 °C ~ 100 °C
- Dimensions
216 mm x 144 mm x 89mm
- Panel cutout
210 mm x 138 mm
- Weight
925 g

4 Panel descriptions

4.1 Front view

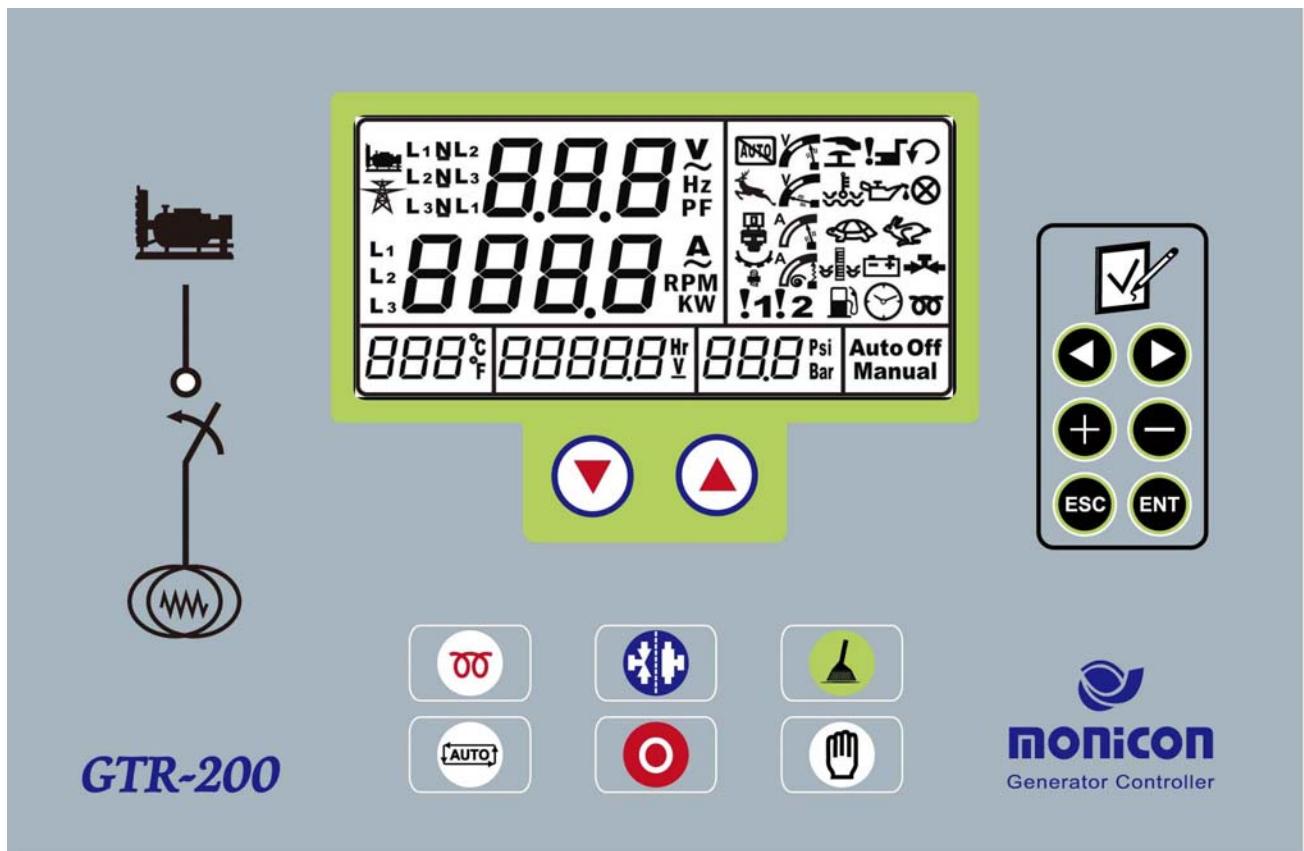


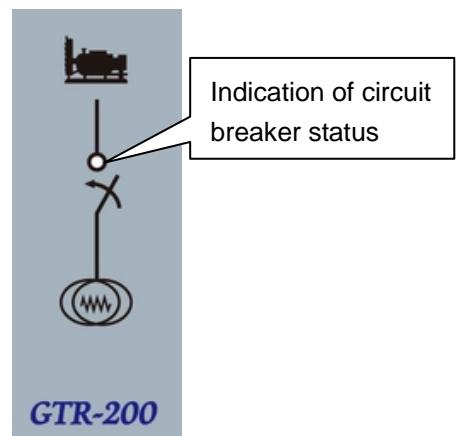
Fig. 1

4.2 Circuit Breaker status indication

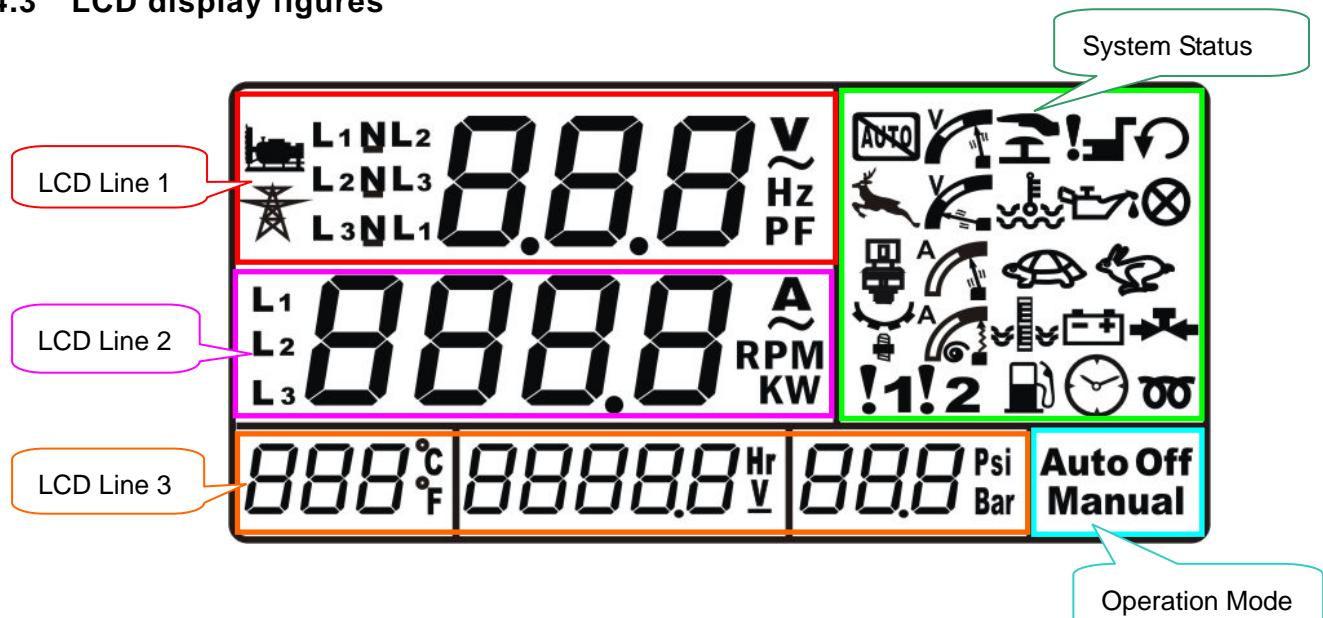
4.2.1 Circuit Breaker status LED

This LED light up when terminal 43 and terminal 44 are wire shorted.

The Circuit Breaker status LED is independent from GTR-200.



4.3 LCD display figures



4.4 LCD Icon Explanations

Icon	Explanation	Icon	Explanation
⚡	Emergency stop	Auto	Auto mode
🌡	High coolant temperature	MANUAL	Manual mode
🦌	Over speed	Off	Off mode
🚗	Low frequency	V	Unit of AC voltage
🔋	Low battery	A	Unit of AC ampere
⛽	Low fuel level	⎓	Unit of DC voltage
שמן	Low oil pressure	Hz	Unit of frequency
⽔	Low coolant level	RPM	Unit of revolution
AUTO	System not in auto mode	Hr	Running hours

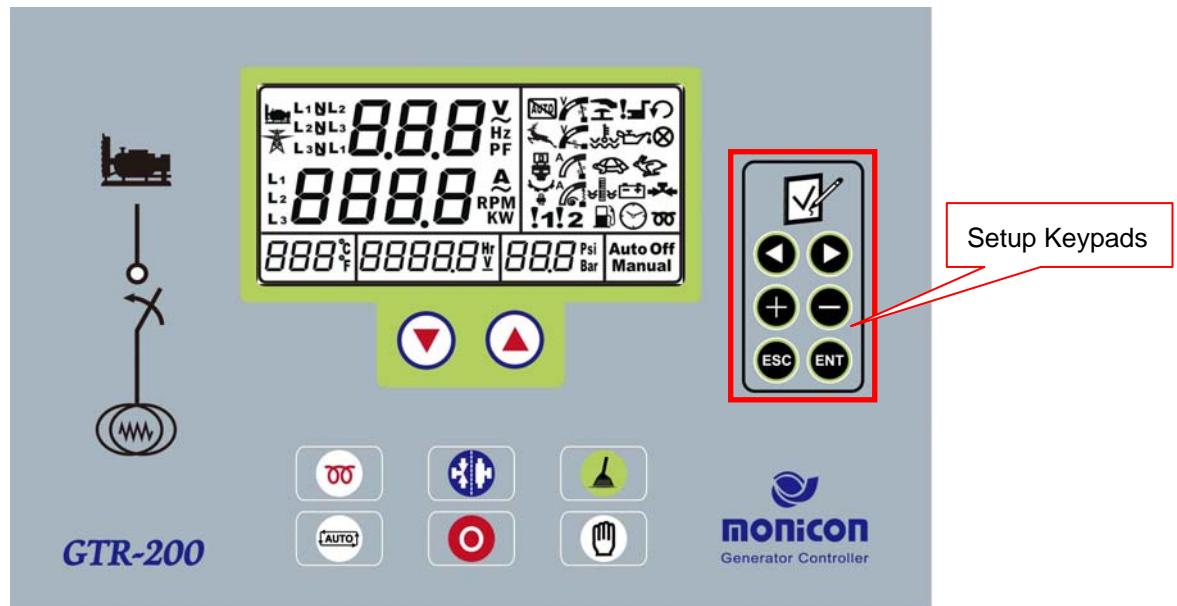
	Over crank		Unit of Celsius
	Over frequency		Unit of Fahrenheit
	Pre-heat		Unit of pressure
	Running		Unit of pressure
	Stopped		Gen-set system
	Idle Mode		Sensor is open
	High Voltage		Sensor is shorted
	Low Voltage		Sensor alarm/Error occurred
	AC short circuit		Parameter number
	AC overload		Save configuration
	IN 1 Action		Configuration upper limit
	IN 2 Action		Configuration lower limit

Fig. 2

4.5 LCD Information

- Battery DC voltage readout
- Running hours
- Coolant temperature readout
- Oil pressure readout
- AC frequency readout
- RPM readout
- Gen-set L1-L2 phase voltage readout
- Gen-set L2-L3 phase voltage readout
- Gen-set L3-L1 phase voltage readout
- Gen-set L1 phase ampere readout
- Gen-set L2 phase ampere readout
- Gen-set L3 phase ampere readout
- Gen-set L1-N phase Voltage readout
- Gen-set L2-N phase voltage readout
- Gen-set L3-N phase voltage readout
- Error records
- Failed to start record
- Total start attempts record

4.6 Operating Keypads



4.6.1 Setup Keypads

-  a. Under the CODE entry mode, this keypad represents the fourth-digit.
b. Under the PARAMETER setting mode, this keypad switches to next parameter.

-  a. Under the CODE entry mode, this keypad represents the third-digit.
b. Under the PARAMETER setting mode, this keypad switches to previous parameter.

-  a. Under the CODE entry mode, this keypad represents the second-digit.
b. Under the PARAMETER setting mode, this keypad increases the setting value.

-  a. Under the CODE entry mode, this keypad represents the first-digit.
b. Under the PARAMETER setting mode, this keypad reduces the setting value.

-  Enter or exit the parameter setting mode

-  Confirm and save the settings

4.6.2 Information swapping keypad



These two keypads are used for display gen-set information alternately



LCD line 1 : L1-L2 gen-set voltage ⇔ L2-L3 gen-set voltage ⇔ L3-L1 gen-set voltage
 ⇔ L1-N gen-set voltage ⇔ L2-N gen-set voltage ⇔ L3-N gen-set voltage ⇔ L1-L2
 utility voltage ⇔ L2-L3 utility voltage ⇔ L3-L1 utility voltage ⇔ L1-L2 gen-set voltage
 ⇔

LCD line 2: L1 gen-set current ⇔ L2 gen-set current ⇔ L3 gen-set current ⇔ Engine
 RPM ⇔ L1 Gen-set current ⇔

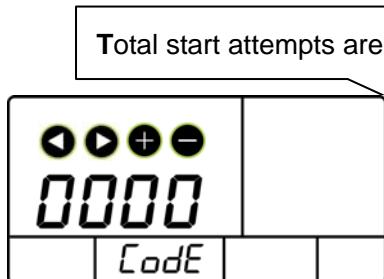
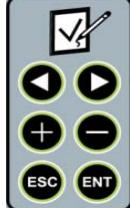
LCD line 3 : Coolant temperature、Run hours、Oil pressure ⇔ Coolant temperature、
 Battery voltage、Oil pressure ⇔ Coolant temperature、Run hours、Oil pressure ⇔
 Coolant temperature、Battery voltage、Oil pressure ⇔

4.7 Enter Code mode

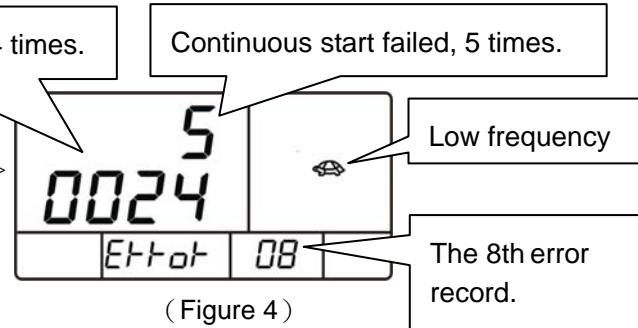
The GTR205 enters the PARAMETER setting mode via the “OFF” mode by following steps.

1. Under the OFF mode, Press the keypad to enter the CODE mode.
2. a. Press the keypad under the code of “0000”, the GTR-200 shows the information about the total start attempt record and failed to start as well as error record.
- b. Press the button under the code display “0528”, the GTR-205 goes into the PARAMETER setting mode. (See Figure 6)

4.7.1 Total start attempts, Fail to start record & Error record.

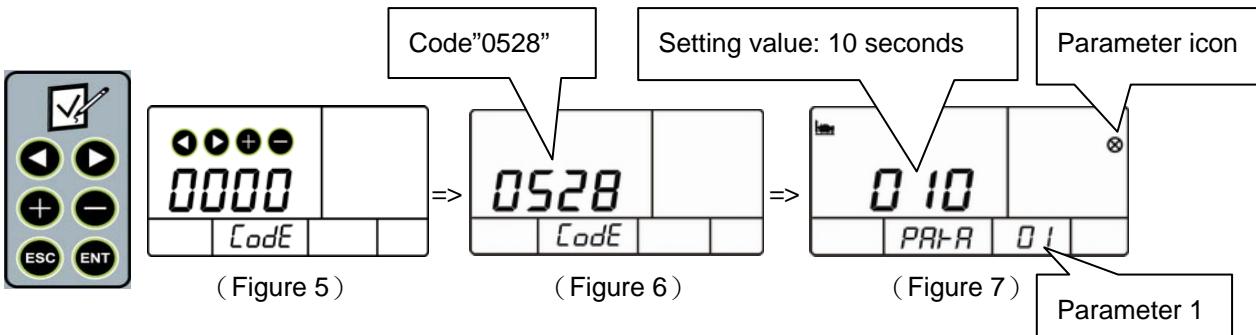


Total start attempts are 24 times.



Press the keypad under code display “0000”, the GTR-200 shows the information of total start attempts and failed to start as well as error record recorded. As the figure 4, LCD shows start failed are 5 times and total start attempts are 24 times as well as the eighth errors record is (Low frequency). Press keypad to see the previous error recorded and press or to see the previous or next error record.

4.7.2 CODE mode entry



Under the OFF mode, Press the keypad **ESC** to enter the CODE mode. Press the keypad **▶** 5 times and press the keypad **+** 2 times and press the keypad **-** 8 times to get the code “0528”. As shown on figure 6. To enter the PARAMETER setting mode by pressing **ENT** under correct code input, the GTR-200 switches into parameter setting mode and parameters switch alternately by pressing the keypad **◀** or **▶**.

4.7.3 Parameter setting mode

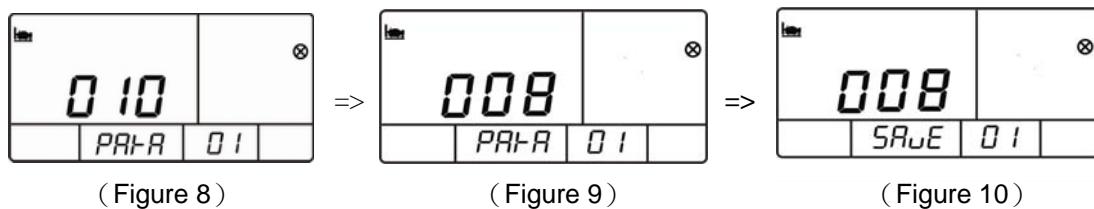
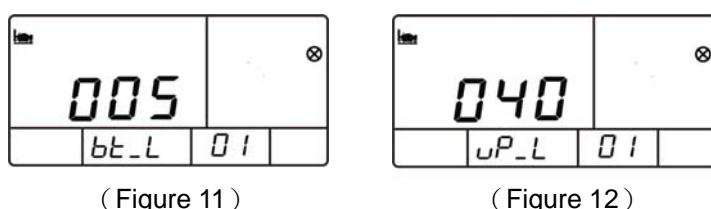


Figure 8 shows the Parameter 1 and the setting is 10 seconds. By pressing **-** or **+** to decrease or increase the setting. For example, To decrease the setting from 10 to 8 seconds by pressing the keypad **-** twice (As Figure 9) and then press the confirmation button **ENT**, the LCD shows “SAVE” on the place of “PARA” for half second. The “SAVE” shows up that means the parameter setting has been changed successfully. In the meantime, the LCD screen changes form Figure 9 to Figure 10 for one second and then back to figure 9 again. To increase the setting value from 10 to 12 seconds by pressing the keypad **+** twice, and then save the the setting. To discard the parameter setting by pressing the keypad **ESC** to return to the previous page or pressing the keypad **◀** or **▶** to go to next or previous parameter.

4.7.4 Parameter setting value range



By pressing **+** or **-** may reach the upper or lower limit of parameter setting. For example : The Stop duration **⊗** ranges from 5 to 40 seconds.

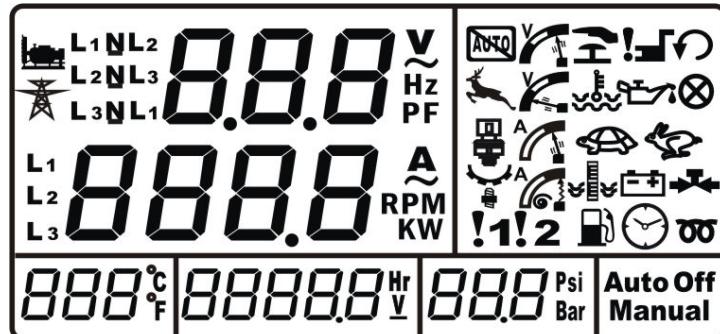
If the LCD shows **bE_L** that means the setting has reached to bottom limit and **uP_L** means that the

setting has reached to upper limit.

5 Operation instruction

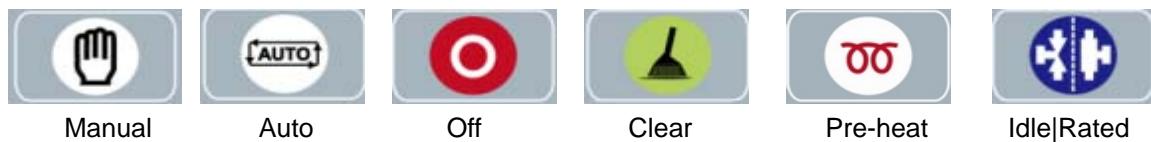
5.1 Please refer to Figure 17 for wiring connection.

5.2 When the GTR-200 connects to the DC power, the LCD panel lights up all icons.



5.3 After one second, the GTR-200 is in OFF mode and information page displays L2-L3 voltage, L2 current and battery voltage.

5.4 Operating keypads



5.4.1 Manual:

Press the keypad  for 2 seconds under the mode of AUTO or OFF to start the engine. Then LCD shows the icon  representing it is in the state of pre-heat. After pre-heat, engine starts immediately. If engine failed to start, the GTR-200 returns to the OFF mode. The pre-heat state may not perform, if the parameter setting of pre-heat is 0 second.

5.4.2 AUTO :

Press the keypad  to switch the GTR-200 into AUTO mode. In the Auto mode, the GTR-200 starts the engine if T18 and T19 are wire shorted and then the LCD shows the icon , only if pre-heat state is enabled. After pre-heat is finished, the engine starts to crank. If the engine failed to start, the system returns to the pre-heat state and then start to crank the engine again. For example, if the conditions and parameter settings are given as follow. All crank criteria are deactivated and Parameter 1: Stop duration is 10 seconds, Parameter 3: Crank attempts are 3 times as well as the Parameter2: Pre-heat duration is 0 second. In the Auto mode, the engine cranks 10 seconds while detecting T18 and T19 wire shorted, and then stop for 10 seconds. After 3 attempts of cracking, the LCD shows the over crank icon  and the alarm is triggered.

5.4.3 OFF :

Press the keypad  to stop the running engine and then  icon shows on the LCD. After 10 seconds

(depends on Parameter 1), the engine stop completely and icon  disappears. The icon  appears on the LCD if the idle function is enabled.

5.4.4 Clear :

Press the keypad  to clear error and deactivate alarm. The LCD back light turns red when errors detecting by GTR-200. Then GTR-200 stops the engine and shows the error messages on the LCD. The button  clears error and switches the GTR-200 into OFF mode.

5.4.5 Pre-heat:

Press the keypad  to manually activate the pre-heat output under OFF or AUTO mode. If the generator is running, the pre-heat function is prohibited.

5.4.6 Rated | Idle :

Press the keypad  to switch the engine to rated or idle speed. The icon  displays when the engine is running at idle speed. Press the keypad  again to switch the engine to rated speed and vice versa. The idle function performs by a relay which outputs a signal (dry contact) to speed governor controller.

6 Parameter setting

6.1 P_RI-R 01 Stop duration

Range: 5~40 sec.

Default: 10 sec

Description: Engine stopping time, this affects the duration of the stop output period.

6.2 P_RI-R 02 Pre-heat duration

Range: 0~10 sec.

Default: 0 sec.

Description: The pre-heat duration means the time before the engine starts.

6.3 P_RI-R 03 Crank attempts

Range: 1~9 attempts

Default: 3 attempts

Description: When cranking attempt is equal or greater than this setting, the GTR-200 stops cranking the engine and display over crank failure.

6.4 P_RI-R 04 Cooling duration

Range: 0~625 sec (Setting value : 0~250, Cooling time=Setting X 2.5sec)

Default: 0 sec

Description: After receiving normal stop command, engine goes into cooling mode and engine runs until the time of this setting is reached.

6.5 P_RI-R 05 Idle duration

Range: 0~1250 sec (Setting value : 0~250, Idle running time=Setting X 5secs)

Default: 0 sec

Description: After engine starts successfully, engine goes into idle mode if the Idle duration is not zero.

6.6 P_RI-R 06 Low battery

Range: 9~32 V

Default: 20 V

Description: When the battery voltage is lower than this setting, the GTR-205 shows low battery fault.

6.7 P_RI-R 07 High frequency setting

Range: 48~70 Hz

Default: 66 Hz

Description: When frequency is greater than this setting, the GTR-205 shows high frequency fault and shuts down the engine.

6.8 PR1-R 08 Protection function 1

Range: 0~255

Default: 255

Description: Enable or disable protection function 1

	Over Frequency	EMS	L.O.P	H.W.T	L.W.L	L.F.L	Over Speed	Low Frequency	Result
Weight Ex.	128	64	32	16	8	4	2	1	
Default	✓	✓	✓	✓	✓	✓	✓	✓	255

Table 1

- ☒ In table 1 “☒” means [Enable], “☒” means [Disable].
- ☒ The setting can be calculated by adding all related bits multiply its weighted value.
- ☒ For example: The setting is

$$128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 = 255$$

6.9 PR1-R 09 Low frequency setting 🚗

Range: 42~61 Hz

Default: 54 Hz

Description: When AC frequency is lower than this setting, The GTR-200 shows low frequency error and shuts down the engine, if protection function is enable.

6.10 PR1-R 10 Input switch type

Range: 0~63

Default: 29

Description: Designate switch type as normal open or normal close.

	Reserve	Reserve	Pressure build deactivate Starter	L.F.L switch	L.W.L switch	H.W.T switch	EMS. switch	L.O.P. switch	Result
Weighted Ex.	128	64	32	16	8	4	2	1	
Default	☒	☒	☒	✓	✓	✓	☒	✓	29

Table 2

- ☒ In table 2, “✓” means input switch as [normal open type] and “☒”means input switch is [normal close type].
- ☒ The setting can be calculated by adding all related bits multiply its weighted value.
- ☒ For example: If the setting of Pressure build deactivates Starter is disabled and EMS switch type is normal close, the setting is $16 + 8 + 4 + 2 + 1 = 29$

6.11 PR1-R 11 Oil pressure switch deactivates starter delay 🚗

Range: 0.4~6 sec (Setting value : 2~30, Delay time=Setting X 0.2sec)

Default: 1.2 sec ($6 \times 0.2 = 1.2$)

Description: When oil pressure switch is activated and its active period is longer than this setting, the GTR-200 deactivates the starter motor, if the Parameter 10 setting value “Pressure build deactivate Starter” is enabled. This setting has nothing to do with low oil pressure delay. The Low oil pressure delay is 1 second which is a fixed value and stated on the 7.4 system parameter.

6.12 PR1-R 12 Coolant temperature sender brand selection

Range: 0~2

Default: 1

Description: Select the brand for coolant temperature sensor.

(0: SUSUKI, 1: SCD, 2: VDO)

6.13 PR1-R 13 Oil pressure sender brand selection

Range: 0~3

Default: 1

Description: Select the brand for oil pressure sensor. User selects the brand for oil pressure sensor.

(0: SUSUKI, 1: SCD, 2: VDO 10 BAR, 3: VDO 5 BAR)

6.14 PR1-R 14 Current Transformer Ratio selection

Range: 50/5~6000/5

Default: 500/5

Description: Selects current transformer ratio.

50/5, 75/5, 100/5, 2: 150/5, 200/5, 250/5, 300/5, 400/5, 500/5, 600/5, 800/5, 1000/5, 1200/5, 1500/5, 1600/5, 2000/5, 2500/5, 3000/5, 3200/5, 4000/5, 5000/5, 6000/5

6.15 PR1-R 15 Low voltage setting

Range: 186~440

Default: 346

Description: When output AC voltage is lower than this setting, the GTR-200 shows low voltage error and shuts down the engine if protection function is enabled.

6.16 PR1-R 16 High voltage setting

Range: 220~484 Volts

Default: 414 Volts

Description: When output AC voltage is higher than this setting, the GTR-200 shows high voltage error and shuts down the engine if protection function is enabled.

6.17 PR1-R 17 AC short setting

Range: 100~500

Default: 450

Description: When output AC current is higher than this setting, the GTR-200 shows AC short error and shuts down the engine if protection function is enabled.

6.18 PR1-R 18 AC overload setting

Range: 40~500 (depends on Parameter 14)

Default: 400

Description: When output AC current is higher than this setting, the GTR-200 shows AC overload error and shuts down the engine if protection function is enabled.

6.19 PR-R 19 High water temperature setting

Range: 75~120 °C

Default: 100

Description: When coolant temperature is higher than this setting, the GTR-200 shows high water temperature error and triggers the alarm.

6.20 PR-R 20 Low oil pressure setting

Range: 5~65 Psi

Default: 15

Description: When oil pressure is lower than this setting, the GTR-200 shows low oil pressure fault and triggers the alarm.

6.21 PR-R 21 Protection function 2

Range : 0~255

Default : 143

Description: Enable or disable protection function 2

	Shut down after trip	Not in Auto.	LOP alarm	HWT alarm	Over current	Short Circuit	Low voltage	High voltage	Result
Weighted EX.	128	64	32	16	8	4	2	1	
Default	✓	✗	✗	✗	✓	✓	✓	✓	143

Table 3

- ☒ In table 3 “☒” means [Enable], “✗” means [Disable].
- ☒ The setting can be calculated by adding all related bits multiply its weighted value.
- ☒ For example : $128 + 8 + 4 + 2 + 1 = 143$

6.22 PR-R 22 Display option

Range : 0~31

Default : 28

Description: Select an option for display the desired parameter source or unit.

	Reserve	Reserve	Reserve	Minimum voltage detect	Minimum frequency detect	RPM-Real/convert.	PSI/BAR	°C/°F	Result
☒	Reserve	Reserve	Reserve	Disable	Disable	Real RPM	PSI	°C	
✓	Reserve	Reserve	Reserve	Enable	Enable	Frequency convert	BAR	°F	
Weighted Sample	128	64	32	16	8	4	2	1	
Default	☒	☒	☒	✓	✓	✓	✗	✗	28

Table 4

- ☒ In table 4 “☒” means [Enable], “✗” means [Disable].
- ☒ The setting can be calculated by adding all related bits multiply its weighted value.
- ☒ For example : 28 (Display : Frequency convert to RPM/ PSI/ °C)

6.23 PR1-R 23 The revolution of deactivating starter

Range : 150~900

Default : 480

Description: When engine speed is higher than this setting, the GTR-200 deactivates starter while cranking.

6.24 PR1-R 24 Over speed

Range : 980~2100 (RPM)

Default : 1980 (RPM)

Description : When engine speed is higher than this setting value, the GTR-200 shows over speed error and shuts down the engine if protection function is enabled.

6.25 PR1-R 25 Stop / Trip Option

Range : 0~255

Default : 0

Description: Select the protection level for each faulty input.

	Over Load	AC Short	Low Voltage	High Voltage	Low Fuel Level	IN2	IN1	Low Frequency	Result
Weighted Level	128	64	32	16	8	4	2	1	
Default	0	0	0	0	0	0	0	0	0

Table 5

- In table 5 “☒” means [Trip], “☑” means [Stop].
- All protection functions listed above are for shutting down the engine.

6.26 PR1-R 26 Pre-activate fuel timer

Range : 0~30 (Second)

Default : 0

Description: This setting designates the fuel output before cranking, if the setting value is not zero.

6.27 PR1-R 27 Revolution numerator

Range : 0~200

Default : 10

Description: This Parameter is related to Parameter 28

6.28 PR1-R 28 R.P.M. denominator

Range : 0~200

Default : 10

Description: The revolution numerator and denominator are the ratio of engine revolution versus total number of fly wheel teeth or the RPM of fly wheel versus the RPM of alternator charger.

For example: Set up the revolution numerator and the denominator to 1 to find input pulse from the LCD.

(A) If the engine revolution is 1800 and alternator revolution is 460 (input pulse), the numerator could be set to 90 and denominator could be set to 23.

Solution: $1800 / 460 = 3.913$

The R.P.M. calculation formula is as below

R.P.M. = Input pulse * (revolution numerator / revolution denominator)

$$1800 = 460 * (90/23)$$

(B) If the engine revolution is 1500 and total count of fly wheel teeth in one second is 4437 (input pulse), the numerator should be set to 45 and denominator should be set to 133.

Solution: $1500 / 4437 = 0.338$

The R.P.M. calculation formula is as below

R.P.M. = Input pulse * (revolution numerator / revolution denominator)

$$1500 = 4437 * (45/133)$$

(C) If the teeth count of engine flywheel is 118. Assume the rated rpm of Gen-set is 1500 rpm. Then the 1500 rpm/50hz => 30 rps/per second also generate $30 \times 118 = 3540$ electronic signals. Then $1500 / 3540 = 0.423$ ($75/177=0.423$), set the numerator to 75 and the denominator to 177.

6.29 PR1-R 29 Safety on timer

Range : 5~40 (Second)

Default : 0

Description: All faulty inputs are ignored until safety timer expired. Except the Emergency stop, over speed, over frequency and low water level.

6.30 PR1-R 30 Shut down after trip timer has expired

Range: 30~7200 (Second)

Setting Range: 1~240

Setting value: 1

Note: Delay time = Setting x 30 Sec.

Default: 30 (1 x 30 = 30)

Description: When trip occurred, the running icon  is flashing and the designated relay output is activated. The GTR-205 shuts down the engine if the fault is not cleared before this timer expires.

6.31 PR1-R 31 Output 0

Relay Output List

Range : 0~27

Default: 0 (All errors)

Description: Please see Relay Output List.

6.32 PR1-R 32 Output 1

Range : 0~27

Default : 3 (Pre-heat output)

Description: Please See Relay Output List

6.33 PR1-R 33 Output 2

Range : 0~27

Default : 12 (System in Auto Mode)

Description : Please See Relay Output List

6.34 PR1-R 34 Output 3

Range : 0~27

Default : 1 (System trip)

Description : Please see Relay Output List

6.35 PR1-R 35 Output 4

Range : 0~27

Default : 2 (Genset power ready trigger)

Description : Please see Relay Output List

6.36 PR1-R 36 Relay 5 (GTR-205 only)

Range : 0~27

Default : 27 (Genset in Normal)

Description : Please see Relay Output List

6.37 PR1-R 37 User code 1

Range : 01~99

Default : 28

Description: Change the user code 1 (0528).

Note: By pressing  &  to save the changed value.

6.38 PR1-R 38 User code 2

Range : 00~99

Default : 05

Description: Change the user code 2 (0528).

Note: By pressing  &  to save the changed value.

- 0. All errors
- 1. System Trip
- 2. Genset Power Ready Trigger
- 3. Pre-heat Output
- 4. Pre-activated fuel
- 5. Idle Output
- 6. Over Speed (RPM)
- 7. Over Frequency
- 8. Low Frequency
- 9. Low Oil Pressure
- 10. High Water Temperature
- 11. System not in Auto Mode
- 12. System in Auto Mode
- 13. Genset Running by Manual operation
- 14. Over Crank
- 15. Over AC Voltage
- 16. Under AC Voltage
- 17. AC Over Current
- 18. AC Short Circuit
- 19. Low Battery
- 20. Auxiliary Input 1
- 21. Auxiliary Input 2
- 22. Low Fuel Level
- 23. Low Water Level
- 24. Emergency Stop
- 25. Sensors Alarm
- 26. Genset Power Ready
- 27. Genset in Normal

List 5

7 System parameters

- Emergency stop delay: 0.4 sec/ action: stop
- Over frequency delay: 2 sec/ action: stop
- High coolant temperature delay: 1 sec/ action: stop
- Low oil pressure delay: 1 sec / action: stop
- Low coolant level delay: 4 sec/ action: stop
- Low frequency delay: 6 sec/ action: trip or stop (see 6.25 parameter 25)
- Low fuel level delay: 4 sec/ action: trip or stop (see 6.25 parameter 25)
- Input 1 / Input 2 delay 2 sec/ action: trip or stop (see 6.25 parameter 25)
- Over load delay 15 sec/ action: trip or stop (see 6.25 parameter 25)
- AC short delay 0.5 sec/ action: trip or stop (see 6.25 parameter 25)
- Low voltage delay 2.5 sec/ action: trip or stop (see 6.25 parameter 25)
- High voltage delay 2.5 sec/ action: trip or stop (see 6.25 parameter 25)
- Low Battery Voltage: 5 sec/ action: alarm
- Circuit breaker closed delay: 7.5 sec
(After Gen-set normally runs about 7.5second, the terminal T41 and terminal T42 forms a dry contact output circuit for about 1 second.)
- Frequency release motor: 16 Hz
- Cranking time: 10 sec
- Protection pending time: 10 sec
(After Gen-set starts successfully for about 10 seconds, in this time period the controller bypasses the faulty signal, except the emergency stop and the over speed.)

8 Back view Description

8.1 Back view

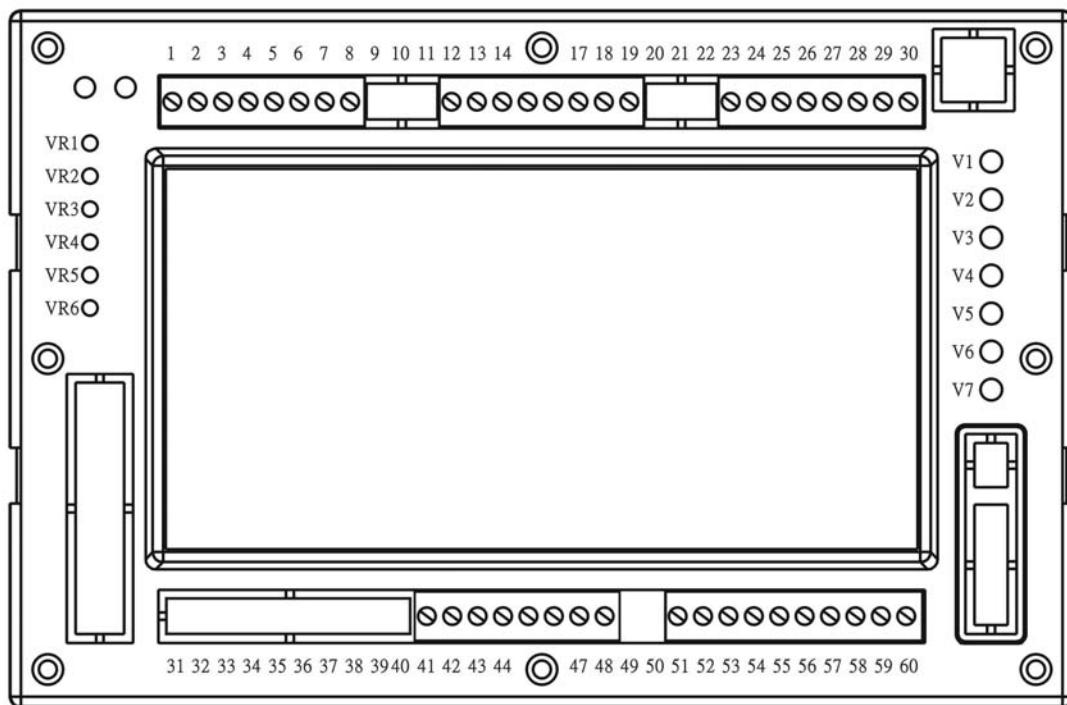


Fig. 13

8.2 Pin definition

Pin	Description	Pin	Description
1	Positive	28	Speed input contact Pin1
2	negative	29	Speed input contact Pin2
3	Starter output	30	Aux. input 1
4	Fuel valve output	41	Aux. output 4
5	Stop output	42	Aux. output 4
6	Alarm output	43	Gen-set on load Indication input
7	Aux. output 0	44	Gen-set on load Indication input
8	Aux. output 1	45	Aux. output 2
12	Aux. input 2	46	Aux. output 3 (Normal Open)
13	Low coolant level switch input	47	Aux. output 3 (Common Pin)
14	Emergency stop switch input	48	Aux. output 3 (Normal Close)
15	Low fuel level switch input	51	L3 Phase Current Input (L)
16	Low oil pressure switch input	52	L3 Phase Current Input (K)
17	High coolant temperature switch input	53	L2 Phase Current Input (L)
18	ATS remote control input contact Pin1	54	L2 Phase Current Input (K)
19	ATS remote control input contact Pin2	55	L1 Phase Current Input (L)
23	Frequency input contact Pin1	56	L1 Phase Current Input (K)
24	Frequency input contact Pin2	57	N Phase Power Input
25	Not connected	58	L3 Phase Power Input
26	Coolant sensor input	59	L2 Phase Power Input
27	Oil pressure sensor input	60	L1 Phase Power Input

Table 6

8.3 V.R. Function

V.R. is adjustment for matching tolerance between external and internal measuring meter readout. All values can be shown on LCD panel.

8.3.1 VR1 : AC Voltage adjust - fine tuning

8.3.2 VR2 : AC Current adjust - fine tuning

8.3.3 VR3 : Water temperature value - fine tuning

8.3.4 VR4 : Oil pressure value - fine tuning

9 Dimensions

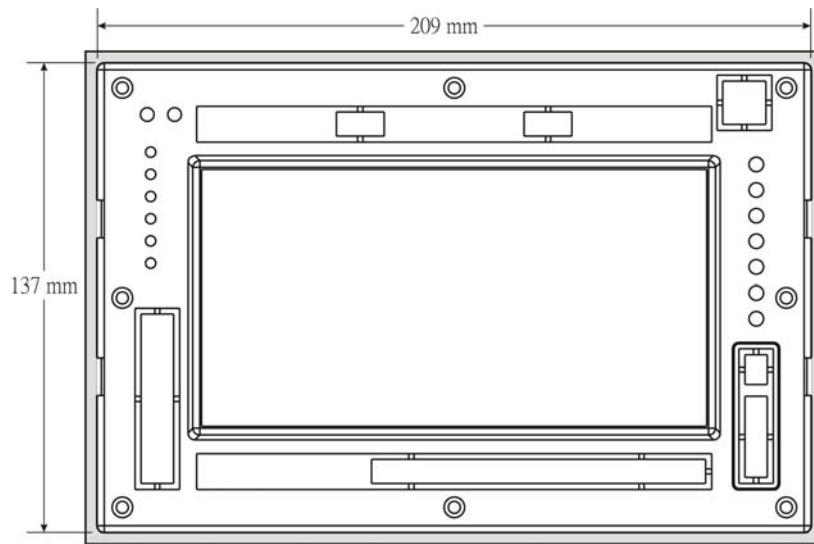


Fig. 14 Back view

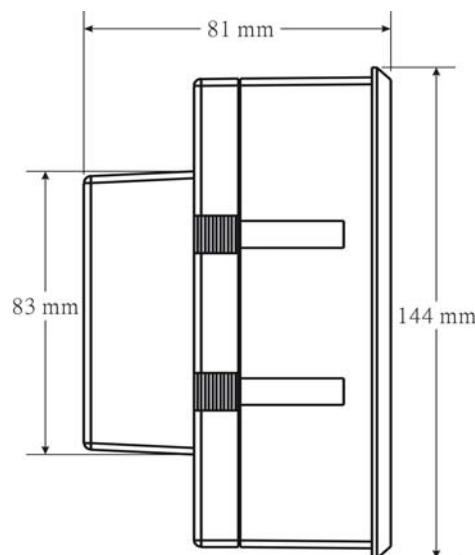


Fig. 15 Side view

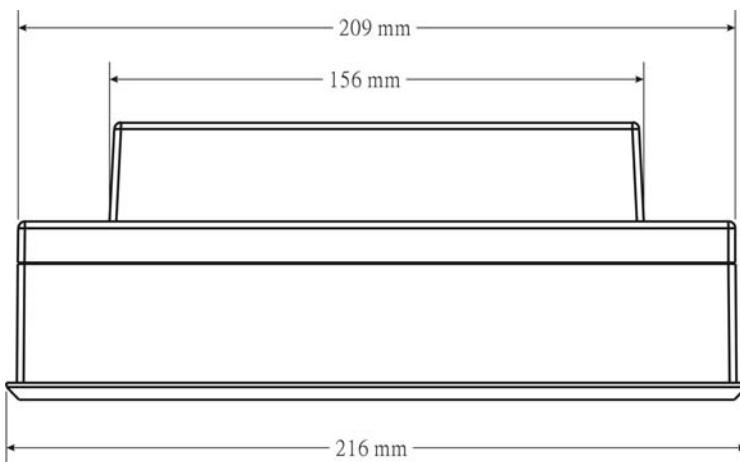


Fig. 16 Top view

10 Wiring Example

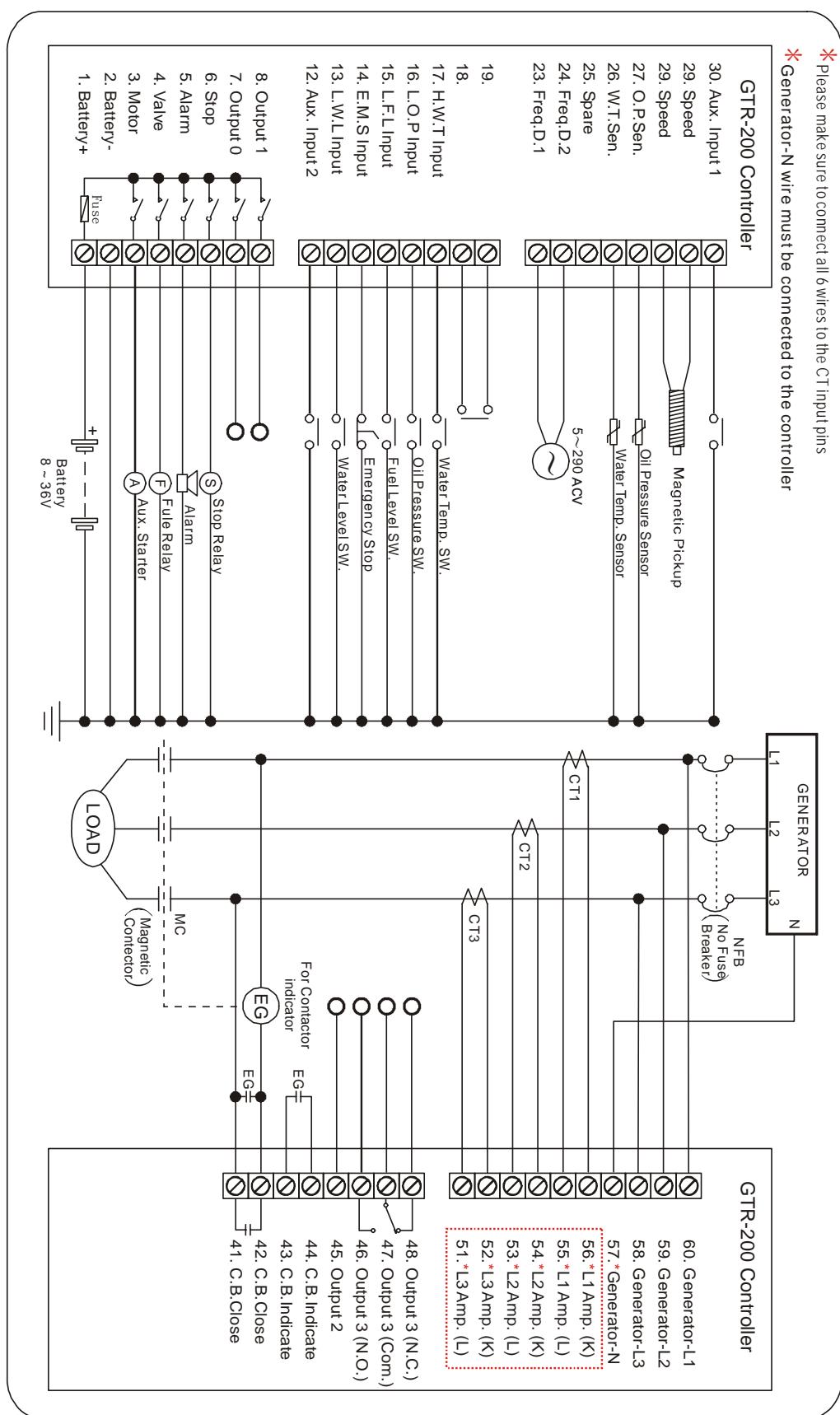


Fig.17